

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-260119

(43)Date of publication of application : 13.09.2002

(51)Int.Cl.

G08B 21/00
 B60K 28/16
 B60R 21/00
 B60R 21/32
 B60R 22/48
 G10L 13/00
 // B60R 11/02

(21)Application number : 2001-062121

(71)Applicant : TOYOTA MOTOR CORP

(22)Date of filing : 06.03.2001

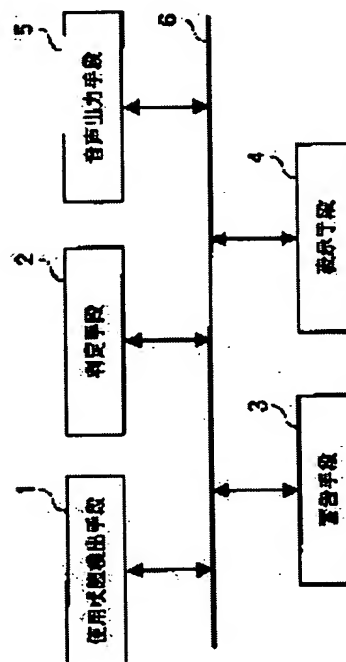
(72)Inventor : NAKAGAWA SHIGERU

(54) ALARM DEVICE AND ALARM METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To make a user understand the meaning of an alarm sufficiently and awaken consciousness for safety.

SOLUTION: This alarm device is provided with a use condition detection means 1 for detecting a use condition of a vehicle, a judging means 2 for judging whether the detected use condition satisfies predetermined conditions or not, an alarm means 3 for giving a predetermined alarm if the use condition does not satisfy the conditions as a result of judgement, and a display means 4 for displaying the reason for satisfying not the conditions when the alarm is given.



LEGAL STATUS

[Date of request for examination]

27.03.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than

the examiner's decision of rejection or
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's
decision of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

*** NOTICES ***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] It is the warning device carry out having a warning means perform predetermined warning, and a display means display the reason for not fulfilling the aforementioned conditions in the case of the aforementioned warning as the feature when not fulfilling the aforementioned conditions a busy condition detection means detect the busy condition of vehicles, a judgment means judge whether the busy condition by which detection was carried out [aforementioned] fulfills predetermined conditions, and as a result of the aforementioned judgment.

[Claim 2] The aforementioned display means is a warning device according to claim 1 characterized by guiding the operation of vehicles which fulfill the aforementioned conditions.

[Claim 3] The warning device according to claim 1 or 2 characterized by having further a voice output means to output voice.

[Claim 4] It is the warning method of carrying out containing the warning step which performs predetermined warning, and the display step which displays in the reason for not fulfilling the aforementioned conditions in the case of the aforementioned warning as the feature when not fulfilling the aforementioned conditions the detection step which detects the busy condition of vehicles, the judgment step which judges whether the busy condition by which detection was carried out [aforementioned] fulfilling predetermined conditions, and as a result of the aforementioned judgment.

[Claim 5] The warning method according to claim 4 characterized by guiding the operation of vehicles which fill the aforementioned conditions with the aforementioned display step.

[Claim 6] The warning method according to claim 4 or 5 characterized by including the voice output step which outputs voice.

[Claim 7] It is the program which performs processing which performs predetermined warning, and processing display the reason which is not fulfilled in the aforementioned conditions in the case of the aforementioned warning when not fulfilling the aforementioned conditions as a result of the aforementioned judgment with the processing which detects the busy condition of vehicles, and the processing which judges whether the busy condition by which detection was carried out [aforementioned] fulfills predetermined conditions.

[Claim 8] A program including the processing to which it shows the operation of vehicles which fulfill the aforementioned conditions according to claim 7.

[Claim 9] A program including the processing which outputs voice according to claim 7 or 8.

[Claim 10] The program of a publication is recorded on either of a claim 7 to the claims 9, and it is the record medium in which reading [computer] is possible.

[Translation done.]

*** NOTICES ***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. ** * shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the warning device and the warning method of urging suitable use of the safety device of vehicles.

[0002]

[Description of the Prior Art] Conventionally, the alarm lamp turned on in the case for example, of seat belt un-wearing, the warning turned on when a handbrake is lengthened are known as a warning device prepared in vehicles. With these warning devices, a user's attentiveness is evoked and vehicles and suitable use of safe equipment are urged. Moreover, a user is a power which understands the meaning of the warning by these warning devices, and keeps a safety operation in mind.

[0003]

[Problem(s) to be Solved by the Invention] However, using vehicles, while a user has not improved the action or situation set as the object of warning may not understand what risk is brought about. Therefore, we are anxious about existence of the user who ignores even if it does not notice even if an alarm lamp lights up, or it notices.

[0004] this invention is made in view of such a situation, makes a user fully understand the meaning of warning, and aims at offering the warning device and the warning method whose consciousness which receives safely can be made to evoke.

[0005]

[Means for Solving the Problem] Composition equipped with a warning means to by_ which invention of a warning device according to claim 1 performs predetermined warning when not fulfilling conditions a busy condition detection means detect the busy condition of vehicles, a judgment means to by_ which the detected busy condition judges whether predetermined conditions are fulfilled, and as a result of a judgment in order to attain the above-mentioned purpose, and a display means display the reason for not fulfilling conditions in the case of warning is taken.

[0006] Thus, since the reason for not fulfilling the condition is displayed while warning when the busy condition of vehicles is detected, and the detected busy condition judges whether predetermined conditions are fulfilled and does not fulfill conditions, a user can be made to be fully able to understand the meaning of warning and the consciousness which receives safely can be made to evoke.

Consequently, it becomes possible to realize safe operation of vehicles.

[0007] Invention according to claim 2 takes the composition which shows a display means to the operation of vehicles which fulfill conditions in a warning device according to claim 1.

[0008] Thus, it is [0009] which becomes possible [demanding suitable use of vehicles from a user] since the operation of vehicles which fulfill conditions is guided when there is warning. Invention according to claim 3 takes the composition further equipped with a voice output means to output voice in a warning device according to claim 1 or 2.

[0010] Thus, since voice is outputted, it becomes possible to evoke a user's attentiveness further.

[0011] Invention of the warning method according to claim 4 takes the composition containing the

warning step which performs predetermined warning, and the display step which displays the reason for not fulfilling conditions in the case of warning, when not fulfilling conditions the detection step which detects the busy condition of vehicles, the judgment step the detected busy condition judges whether predetermined conditions are fulfilled to be, and as a result of a judgment.

[0012] Thus, since the reason for not fulfilling the condition is displayed while warning when the busy condition of vehicles is detected, and the detected busy condition judges whether predetermined conditions are fulfilled and does not fulfill conditions, a user can be made to be fully able to understand the meaning of warning and the consciousness which receives safely can be made to evoke. Consequently, it becomes possible to realize safe operation of vehicles.

[0013] Invention according to claim 5 takes the composition to which it shows the operation of vehicles which fulfill conditions at a display step in the warning method according to claim 4.

[0014] Thus, it is [0015] which becomes possible [demanding suitable use of vehicles from a user] since the operation of vehicles which fulfill conditions is guided when there is warning. Invention according to claim 6 takes the composition containing the voice output step which outputs voice in the warning method according to claim 4 or 5.

[0016] Thus, since voice is outputted, it becomes possible to evoke a user's attentiveness further.

[0017] Invention of a program according to claim 7 takes the composition which performs processing which performs predetermined warning, and processing which displays the reason for not fulfilling conditions in the case of warning, when not fulfilling conditions as a result of a judgment with the processing which detects the busy condition of vehicles, and the processing whose detected busy condition judges whether predetermined conditions are fulfilled.

[0018] Thus, since the reason for not fulfilling the condition is displayed while warning when the busy condition of vehicles is detected, and the detected busy condition judges whether predetermined conditions are fulfilled and does not fulfill conditions, a user can be made to be fully able to understand the meaning of warning and the consciousness which receives safely can be made to evoke. Consequently, it becomes possible to realize safe operation of vehicles.

[0019] Invention according to claim 8 takes composition including the processing to which it shows the operation of vehicles which fulfill conditions in a program according to claim 7.

[0020] Thus, it is [0021] which becomes possible [demanding suitable use of vehicles from a user] since the operation of vehicles which fulfill conditions is guided when there is warning. Invention according to claim 9 takes composition including the processing which outputs voice in a program according to claim 7 or 8.

[0022] Thus, since voice is outputted, it becomes possible to evoke a user's attentiveness further.

[0023] The program of a publication is recorded on either of a claim 7 to the claims 9, and invention of a record medium according to claim 10 takes the composition which can be read by computer.

[0024] Since the reason for not fulfilling the condition is displayed while warning when the busy condition of vehicles is detected, and the detected busy condition judges whether predetermined conditions are fulfilled and does not fulfill conditions by this composition, a user can be made to be fully able to understand the meaning of warning and the consciousness which receives safely can be made to evoke. Consequently, it becomes possible to realize safe operation of vehicles.

[0025]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Although the gestalt of this operation explains taking the case of the warning device carried in an automobile, for example, this invention is not necessarily limited only to an automobile.

[0026] Drawing 1 is the block diagram showing the outline composition of the warning device concerning the gestalt of operation of this invention. The warning device concerning the gestalt of this operation is equipped with the busy condition detection means 1, the judgment means 2, the warning means 3, the display means 4, and the voice output means 5, and these are mutually connected by the control bus 6.

[0027] The busy condition detection means 1 is equipped with various kinds of sensors which detect the

wearing state of safe equipment, detects the wearing state of a seat belt, the wearing state of an infant seat, the operating position of a headrest rate, etc., and outputs them as data. Moreover, detection of the angle a seat back's and crew's taking-a-seat position and detection of whether to have equipped backward with the infant seat the passenger seat of the automobile which equips a passenger seat air bag are also performed using a crew detection sensor.

[0028] Here, a wearing state is a concept which whether the safety device is not only used but includes whether it has equipped appropriately. That is, it cannot be called suitable wearing if it is not set so that a belt may require the shoulder support of a seat belt for crew's shoulder, though the seat belt is used. In order to detect whether wearing with these appropriate safe equipment is carried out, the technique of having used the image recognition is employable. That is, it is possible to detect whether the height of the shoulder support of a seat belt is adjusted appropriately by inputting the picture which photoed crew from the transverse plane, and recognizing positions, such as an eye and a shoulder, from a picture. In addition, the busy condition detection means 1 contains all the sensors for collecting the information about the wearing state of safe equipment of an automobile in addition to the above.

[0029] Moreover, the busy condition detection means 1 detects transition of the rotational frequency of the treading-in condition of the accelerator by the user of an automobile, a travel speed, the operating state of ABS (anti-lock braking(or brake) system), time, and an engine, setup (parking, reverse, a drive, neutral, etc.) of transmission, the operating condition of a right and left chip box signal, a head-lamp lighting situation, etc., and outputs them as data. Moreover, detection of the degree of the acceleration using G sensor and a slowdown and the degree of braking and the current position of the automobile using GPS (Global Positioning Satellite (or System)) are detectable. Furthermore, it is also possible to detect existence of the thing alcohol in a user and its level using an air-content analyzer or a **** detector.

[0030] Furthermore, the busy condition detection means 1 detects decrease condition, such as the consumables of an automobile, for example, a tire, and a clutch. Moreover, any unusual detection of the failed state of an automobile, for example, a lamp piece, decrease of oil and dirt, and water temperature is performed. That is, the busy condition detection means 1 contains all the sensors for collecting the information about the operation state of an automobile.

[0031] The judgment means 2 judges whether the busy condition detected with the busy condition detection means 1 conforms to predetermined criteria. The criteria of a judgment are established respectively corresponding to various sensors. For example, about the height of headrest REITO, it is proper height that the position of a user's ear and the center position of headrest REITO are in the same height, and when having separated from this height, the judgment with nonconformance is made. This judgment result is outputted as data.

[0032] As a result of the judgment by the judgment means 2, the warning means 3 warns, when the busy condition does not conform to predetermined criteria. Warning is performed by lighting of for example, a warning lamp, alarm, etc. It is also possible to warn by combining with the display means 4 and the voice output means 5.

[0033] The display means 4 consists of liquid crystal displays, and performs the display of a character, a still picture, and an animation. Moreover, it is also possible to carry out image display of the content of warning in the case of the warning by the warning means 3. a screen display [in / the display means 4 / in the voice output means 5] -- or voice guidance, a sound effect, etc. by language are outputted independently The voice output means 5 can be equipped with for example, the amplifier section, a CD player, a DVD player, a CD-ROM drive, an MP3 player, a stereo loudspeaker, etc., and can reproduce and output audio data and voice data.

[0034] Next, operation of the warning device concerning the gestalt of this operation constituted as mentioned above is explained. Drawing 2 is a flow chart which shows operation of the warning device concerning the gestalt of this operation. First, the busy condition detection means 1 detects the operating condition of a safety device from various sensors (Step S1). Next, the judgment means 2 judges whether the operating condition is right from the detection result in Step S1 (Step S2). It ends, when right, and when not right, the display means 4 displays the present operating condition (Step S3).

[0035] Drawing 3 is the example of the screen which displayed the operating condition on the display means in Step S3. It is belt as shown in drawing 3. height (height of a seat belt), seatback angle (angle of a seat back), and seat The situation currently used correctly is shown about belt (wear of a seat belt). About the item to which the right use is carried out, you may display in green or a blue color, for example. Moreover, it is possible to also make a user check to output voice from the voice output means 5, and to be correctly equipped with each item. For example, you may perform voice guidance "the seat belt is worn correctly."

[0036] However, about headrest (height of headrest REITO), it is not adjusted correctly. For example, it displays in a red color, and you may make it urge a user's attention about the item to which the right use is not carried out. Moreover, you may output the voice "headrest REITO is not adjusted correctly" from the voice output means 5, for example.

[0037] Next, it indicates un-arranging [which may take place when the safety device is not used correctly] by the animation (step S4). This serves as warning to a user. Here, such an animation is called "the movie which becomes like this", and a user's attention is called. Drawing 4 is the example of the screen which indicates un-arranging [which may take place when headrest REITO is not adjusted correctly]. When drawing 4 (a) is not adjusted correctly but headrest REITO is in a low position rather than proper height, the state just before getting shocks, such as a rear-end collision, for example is shown from back, and ** (b) shows the state immediately after shocking. Drawing 4 (a) and (b) are a part of animations, and these are displayed continuously in fact. For example, when headrest REITO is in a low position rather than proper height and impulse force is received from back, an operator's neck is bent back greatly and signs that a serious damage is given around a neck are shown.

[0038] In case an animation is displayed, the sound in which a tire creaks by the voice output means 5, slamming the brake, the sound to which other automobiles collide with the posterior part of the automobile, and the voice which the man of "being dangerous" cries for further are reproduced as voice data, and it complains of having been in the dangerous state to a user.

[0039] Thus, it becomes possible by outputting voice to evoke a user's attentiveness further.

[0040] Thus, after indicating that it is in a dangerous state, the right operation of a safety device is displayed by the animation (Step S5). Here, such an animation is called "the right way movie to be used", and a user's suitable use is urged. Drawing 5 is the example of the screen which displays the right usage. Drawing 5 (a) is a screen to which red shows the safety device (here headrest REITO) to which its attention is paid and which a user is made to observe, and ** (b) is a screen in which the state where it adjusted to proper height is shown. Drawing 5 (a) and (b) are a part of animations, and these are displayed continuously in fact. For example, headrest REITO displays by the animation that it goes up along with an arrow from a low state to the position shown in ** (b) like drawing 5 (a).

[0041] Thus, it is [0042] which becomes possible [demanding suitable use of vehicles from a user] since the operation of vehicles which fulfill conditions is guided when there is warning. In addition, although the safety device was taken for the example in the above explanation, it is possible to apply this invention also about the automobilism method or a maintenance state. For example, although the mileage of an automobile is over a fixed distance and the timing belt of an engine should be exchanged, when not being exchanged, it appeals to a user as a screen display and a voice output against the fault which may happen to the automobile from now on. And the animation which shows signs that it is exchanging in the animation which presses for exchange of a timing belt, the service station, etc. is displayed.

[0043] Moreover, when high operation of danger is made, you may express an operation situation as an animation to a user. For example, when operation to which the body shakes greatly at the time of a brake is being carried out, it expresses as an animation what movement the automobile is carrying out. Next, the animation from which an automobile starts spin as applying brakes with which the body shakes greatly on the downward slope in case of rainy weather by "the movie which becomes like this" is displayed. Next, the point (tips) to which the brakes which do not sway the body on "the right way movie to be used" are applied is displayed.

[0044] In addition, when a key is inserted in an ignition switch by the user, a key is turned to an

accessory position as timing of the warning to the above-mentioned user, for example, a shift lever goes into a D range and a travel speed reaches a predetermined value, or when a travel speed becomes below a predetermined value, the time of an automobile stopping etc. can be considered. It is thought that the timing of the warning about a safety device specifically has a desirable time of a shift lever going into a D range, and the timing of the warning about the article of consumption of an automobile has a desirable time of a key being inserted in an ignition switch and a key being turned to an accessory position. Moreover, it is thought that the warning about a user's operating method has the time of a halt of the beginning after the high action of danger was performed, a desirable time of starting the engine of an automobile of a degree, etc.

[0045] Thus, since the reason for not fulfilling the condition is displayed while warning when according to the warning device concerning the gestalt of this operation the busy condition of vehicles is detected, and the detected busy condition judges whether predetermined conditions are fulfilled and does not fulfill conditions, a user can be made to be fully able to understand the meaning of warning and the consciousness which receives safely can be made to evoke. Consequently, it becomes possible to realize safe operation of vehicles.

[0046]

[Effect of the Invention] As having explained above, when the warning device concerning this invention does not fulfill the aforementioned conditions a busy condition detection means detect the busy condition of vehicles, a judgment means to by_ which the busy condition by which detection was carried out [aforementioned] judges whether predetermined conditions are fulfilled, and as a result of the aforementioned judgment, the composition have a warning means perform predetermined warning, and a display means display the reason which is not fulfilled in the aforementioned conditions in the case of the aforementioned warning takes.

[0047] Thus, since the reason for not fulfilling the condition is displayed while warning when the busy condition of vehicles is detected, and the detected busy condition judges whether predetermined conditions are fulfilled and does not fulfill conditions, a user can be made to be fully able to understand the meaning of warning and the consciousness which receives safely can be made to evoke. Consequently, it becomes possible to realize safe operation of vehicles.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the outline composition of the warning device concerning the gestalt of operation of this invention.

[Drawing 2] It is the flow chart which shows operation of the warning device concerning the gestalt of this operation.

[Drawing 3] It is the example of the screen which displayed the operating condition on the display means.

[Drawing 4] (a) When headrest REITO is not adjusted correctly but is in a low position rather than proper height, it is drawing showing a state just before getting shocks, such as a rear-end collision, for example from back.

(b) It is drawing showing the state immediately after shocking.

[Drawing 5] (a) It is drawing showing the screen made to observe in red the safety device to which its attention is paid.

(b) It is the screen in which the state where it adjusted to proper height is shown.

[Description of Notations]

1 [-- A warning means, 4 / -- A display means, 5 / -- A voice output means, 6 / -- Control bus.] -- A busy condition detection means, 2 -- A judgment means, 3

[Translation done.]

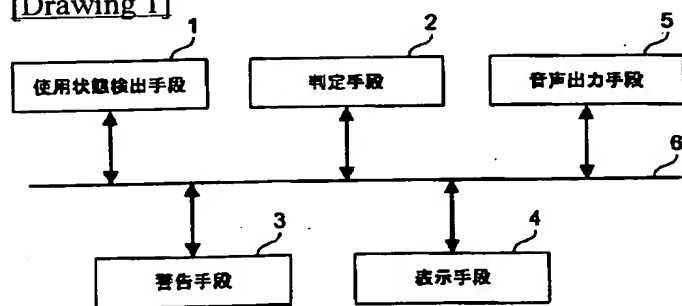
* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

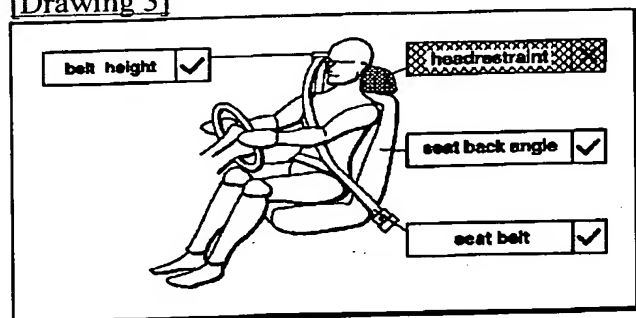
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

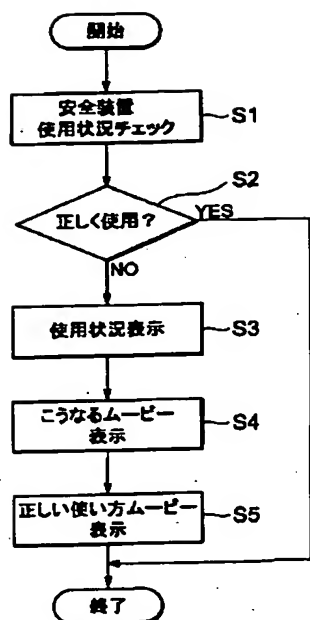
[Drawing 1]



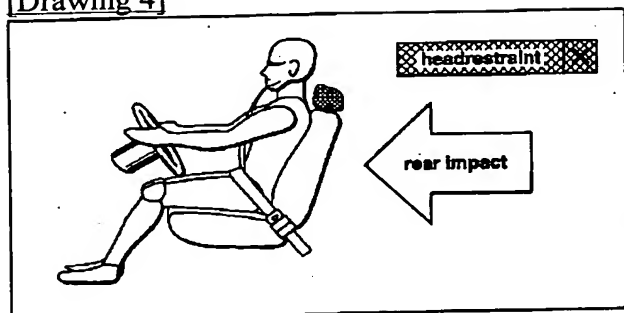
[Drawing 3]



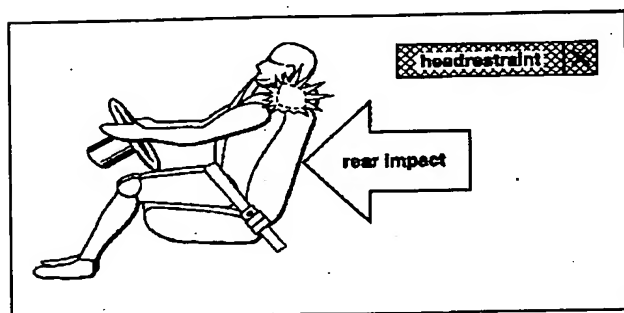
[Drawing 2]



[Drawing 4]

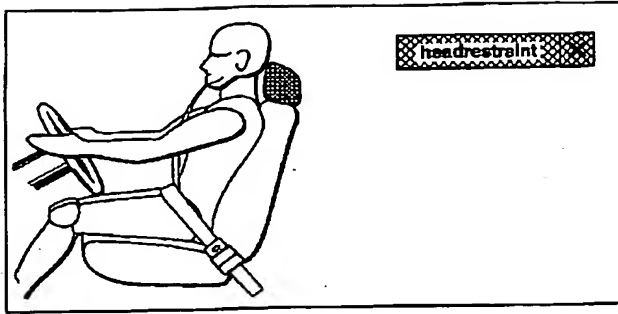


(a)

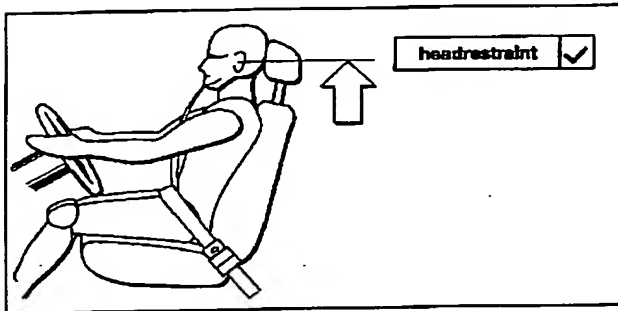


(b)

[Drawing 5]



(a)



(b)

[Translation done.]

公開特許・実用（抄録 A）

特開 2002-260119

【名称】警告装置及び警告方法

審査／評価者請求 未 請求項／発明の数 10 （公報 7頁、抄録 5頁）

公開日 平成14年(2002) 9月13日

出願／権利者 トヨタ自動車株式会社（愛知県豊田市トヨタ町1番地）
 発明／考案者 中川 茂
 出願番号 特願2001-62121 平成13年(2001) 3月 6日
 代理人 長谷川 芳樹
 Fターム 3D020, 3D037, 3D054, 5C086, 5D045

Int. Cl. 7 識別記号
 G08B 21/00
 B60K 28/16
 B60R 21/00 626
 21/32
 22/48
 G10L 13/00
 // B60R 11/02
 FI
 G08B 21/00 ※
 ※最終頁に続く

【発明の属する技術分野】本発明は、車両の安全装置の適切な使用を促す警告装置及び警告方法に関する。

(57) 【要約】

【課題】 ユーザに警告の意味を十分に理解させ、安全に対する意識を喚起させること。

【解決手段】 車両の使用状態を検出する使用状態検出手段1と、検出された使用状態が所定の条件を満たすか否かを判定する判定手段2と、判定の結果、条件を満たさない場合は、所定の警告を行う警告手段3と、警告の際、条件を満たさない理由を表示する表示手段4とを備える構成を採る。

【特許請求の範囲】

【請求項1】 車両の使用状態を検出する使用状態検出手段と、

前記検出された使用状態が所定の条件を満たすか否かを判定する判定手段と、

前記判定の結果、前記条件を満たさない場合は、所定の警告を行う警告手段と、

前記警告の際、前記条件を満たさない理由を表示する表示手段とを備えることを特徴とする警告装置。

【請求項2】 前記表示手段は、前記条件を満たすような車両の使用方法を案内することを特徴とする請求項1記載の警告装置。

【請求項3】 音声を出力する音声出力手段を更に備えることを特徴とする請求項1又は請求項2記載の警告装置。

【請求項4】 車両の使用状態を検出する検出ステップと、

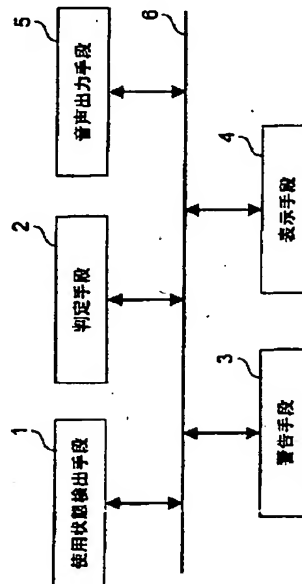
前記検出された使用状態が所定の条件を満たすか否かを判定する判定ステップと、

前記判定の結果、前記条件を満たさない場合は、所定の警告を行う警告ステップと、

前記警告の際、前記条件を満たさない理由を表示する表示ステップとを含むことを特徴とする警告方法。

【請求項5】 前記表示ステップでは、前記条件を満たすような車両の使用方法を案内することを特徴とする請求項4記載の警告方法。

【請求項6】 音声を出力する音声出力ステップを含むことを特徴とする請求項4又は請求項5記載の警告



方法。

【請求項7】 車両の使用状態を検出する処理と、前記検出された使用状態が所定の条件を満たすか否かを判定する処理と、

前記判定の結果、前記条件を満たさない場合は、所定の警告を行う処理と、

前記警告の際、前記条件を満たさない理由を表示する処理とを実行させるプログラム。

【請求項8】 前記条件を満たすような車両の使用方法を案内する処理を含む請求項7記載のプログラム。

【請求項9】 音声を出力する処理を含む請求項7又は請求項8記載のプログラム。

【請求項10】 請求項7から請求項9のいずれかに記載のプログラムが記録され、コンピュータにより読み取り可能な記録媒体。

【発明の実施の形態】以下、本発明の実施の形態について、図面を参照して説明する。本実施の形態では、例えば、自動車に搭載される警告装置を例にとって説明するが、本発明は、自動車のみに限定されるわけではない。

図1は、本発明の実施の形態に係る警告装置の概略

構成を示すブロック図である。本実施の形態に係る警告装置は、使用状態検出手段1と、判定手段2と、警告手段3と、表示手段4と、音声出力手段5とを備えており、これらは制御バス6により相互に接続されている。

使用状態検出手段1は、安全装備の装着状態を検出する各種のセンサを備えており、シートベルトの装着状態、チャイルドシートの装着状態、ヘッドレストレイトの使用位置等を検出し、データとして出力する。また、乗員検知センサを用いてシートバックの角度や、乗員の着席位置の検出、助手席エアバッグを装備する自動車の助手席にチャイルドシートを後ろ向きに装着しているかどうかの検出も行われる。

ここで、装着状態とは、単に安全装置を用いているかどうかだけではなく、適切に装着しているかどうかを含む概念である。すなわち、シートベルトを使用していたとしても、シートベルトのショルダーアンカーが、乗員の肩にベルトがかかるようにセットされていなければ適切な装着とは言えない。これらの安全装備が適切な装着がされているかどうかを検出するためには、例えば、画像認識を用いた手法を採用することができる。すなわち、乗員を正面から撮影した画像を入力し、目、肩等の位置を画像から認識することによって、シートベルトのショルダーアンカーの高さが適切に調整されているかどうかを検出することが可能である。なお、使用状態検出手段1は、上記以外に、自動車の安全装備の装着状態に関する情報を収集するためのあらゆるセンサを含む。

また、使用状態検出手段1は、自動車の使用者によるアクセルの踏み込み具合、走行速度、ABS (anti-lock braking (or brake) system) の作動状態、時刻、エンジンの回転数の推移、トランスミッションの設定 (パーキング、リバース、ドライブ、ニュートラル等)、左右折信号の使用状況、ヘッドランプ点灯状況等を検出し、データとして出力する。また、Gセンサを用いた加速及び減速の度合い、ブレーキングの度合いの検出や、GPS (Global Positioning Satellite (or System)) を用いた自動車の現在位置の検出を行うことができる。さらに、空気量分析器又は酒気検知器を利用して使用者におけるアルコールの存在及びそのレベルを検出することも可能である。

さらに、使用状態検出手段1は、自動車の消耗部品、例えば、タイヤやクラッチ等の減り具合を検出する。また、自動車の故障状態、例えば、ランプ切れ、オイルの減りや汚れ、水温の異常などの検出も行われる。使用状態検出手段1は、自動車の操作状態に関する情報を収集するためのあらゆるセンサを含んでいる。

判定手段2は、使用状態検出手段1で検出された使用状態が、所定の基準に適合しているかどうかを判定する。判定の基準は、各種センサにそれぞれ対応して設けられている。例えば、ヘッドレストレイトの高さについては、ユーザの耳の位置とヘッドレストレイトの中心位置とが同一の高さにあることが適正な高さであり、この高さを外れている場合は、不適合との判定がなされる。この判定結果はデータとして出力される。

警告手段3は、判定手段2による判定の結果、使用状態が所定の基準に適合していない場合に警告を行う。警告は、例えば、警告ランプの点灯、アラームなどによって行われる。表示手段4及び音声出力手段5と併せて警告を行うことも可能である。

表示手段4は、例えば、液晶ディスプレイから構成

され、文字、静止画、及び動画の表示を行う。また、警告手段3による警告の際に、警告内容を画像表示することも可能である。音声出力手段5は、表示手段4における画面表示と共に、又は単独で言葉による音声案内や効果音等を出力する。音声出力手段5は、例えば、アンプ部、CDプレイヤー、DVDプレイヤー、CD-ROMドライブ、MP3プレイヤー、ステレオスピーカ等を備え、オーディオデータや音声データを再生し、出力することができる。

次に、以上のように構成された本実施の形態に係る警告装置の動作について説明する。図2は、本実施の形態に係る警告装置の動作を示すフローチャートである。まず、使用状態検出手段1は、各種センサから安全装置の使用状態を検出する (ステップS1)。次に、判定手段2は、ステップS1における検出結果から、その使用状況が正しいかどうかを判定する (ステップS2)。正しい場合は終了し、正しくない場合は、表示手段4が現在の使用状況を表示する (ステップS3)。

図3は、ステップS3において、表示手段に使用状況を表示した画面の例である。図3に示すように、belt height (シートベルトの高さ)、seat back angle (シートバックの角度)、及びseat belt (シートベルトの着用) については、正しく使用されている状況が示されている。正しい使用がされている項目については、例えば、グリーン又はブルーの色で表示しても良い。また、音声出力手段5から音声を出し、各項目が正しく装着されていることをユーザに確認させることも可能である。例えば、「シートベルトは正しく着用されています。」という音声案内を行っても良い。

ところが、headrest (ヘッドレストレイトの高さ) については、正しく調整されていない。正しい使用がされていない項目については、例えば、赤い色で表示してユーザの注意を促すようにしても良い。また、音声出力手段5から、例えば、「ヘッドレストレイトが正しく調整されていません。」というような音声を出しても良い。

次に、安全装置が正しく使用されていない場合に起こり得る不都合を、動画により表示する (ステップS4)。これがユーザに対する警告となる。ここでは、このような動画を「こうなるムービー」と称してユーザの注意を喚起する。図4は、ヘッドレストレイトが正しく調整されていない場合に起こり得る不都合を表示する画面の例である。図4(a)は、ヘッドレストレイトが正しく調整されず、適正な高さよりも低い位置にある場合、後方から、例えば追突などの衝撃を受ける直前の状態を示しており、同(b)は、衝撃を受けた直後の状態を示している。図4(a)と(b)は、動画の一部であり、実際にはこれらが連続的に表示される。例えば、ヘッドレストレイトが適正な高さよりも低い位置にある場合、後方から衝撃力を受けると、運転者の首が大きく後方に曲げられ、首の周辺に大きなダメージが与えられる様子が示される。

動画を表示する際には、音声出力手段5により、例えば、急ブレーキをかけてタイヤがきしむ音、その自動車の後部に他の自動車が衝突する音、さらに「あぶない！」といった人が叫ぶ声を音声データとして再生し、危険な状態であったことを使用者に訴える。

このように、音声を出力することによって、ユーザの注意力をさらに喚起することが可能となる。

このように危険な状態であることを表示した後、安全装置の正しい使用方法を動画により表示する(ステップS5)。ここでは、このような動画を「正しい使い方ムービー」と称してユーザの適切な使用を促している。図5は、正しい使い方を表示する画面の例である。図5(a)は、着目する安全装置(ここでは、ヘッドレストレイト)を赤色で示してユーザに注目させる画面であり、同(b)は、適正な高さに調整した状態を示す画面である。図5(a)と(b)は、動画の一部であり、実際にはこれらが連続的に表示される。例えば、図5(a)のようにヘッドレストレイトが低い状態から、同(b)に示す位置まで矢印に沿って上昇するように動画で表示する。

このように、警告があった場合は、条件を満たすような車両の使用方法を案内するので、ユーザに対して車両の適切な使用を促すことが可能となる。

なお、以上の説明では、安全装置を例に取ったが、自動車の運転方法や維持状態についても本発明を適用することが可能である。例えば、自動車の走行距離が一定の距離を超えており、エンジンのタイミングベルトを交換すべきであるのに、交換されていない場合、今後その自動車に起こりうる不具合を画面表示と音声出力で使用者に訴える。そして、タイミングベルトの交換を催促する動画、及び自動車整備工場等で交換している様子を示す動画を表示する。

また、危険度の高い運転がなされた場合、ユーザに対して運転状況を動画で表示しても良い。例えば、ブレーキ時に車体が大きく揺れるような運転をしている場合、自動車がどんな動きをしているのかを動画で表示する。次に、「こうなるムービー」によって、雨天時の下り坂で車体が大きく揺れるようなブレーキをかけると自動車がスピンを起こす動画を表示する。次に、「正しい使い方ムービー」で車体を揺らさないブレーキをかけるポイント(コツ)を表示する。

なお、上記のユーザへの警告のタイミングとしては、例えば、ユーザによりイグニションスイッチにキーが差し込まれ、アクセサリポジションまでキーが回されたとき、シフトレバーがDレンジに入ったとき、走行速度が所定値に到達したとき、または走行速度が所定値以下となったとき、自動車が停止したときなどが考えられ

る。具体的には、安全装置に関する警告のタイミングは、シフトレバーがDレンジに入ったときが望ましく、自動車の消耗品に関する警告のタイミングは、イグニションスイッチにキーが差し込まれ、アクセサリポジションまでキーが回されたときが望ましいと考えられる。またユーザの運転方法に関する警告は、危険度の高い行為が行われた後の最初の停止時や、次に自動車のエンジンをかけるときなどが望ましいと考えられる。

このように、本実施の形態に係る警告装置によれば、車両の使用状態を検出し、検出された使用状態が所定の条件を満たすか否かを判定し、条件を満たさない場合は、警告を行うと共に、その条件を満たさない理由が表示されるので、ユーザに警告の意味を十分に理解させ、安全に対する意識を喚起させることができる。その結果、車両の安全な運行を実現することが可能となる。

【図面の簡単な説明】

【図1】本発明の実施の形態に係る警告装置の概略構成を示すブロック図である。

【図2】本実施の形態に係る警告装置の動作を示すフローチャートである。

【図3】表示手段に使用状況を表示した画面の例である。

【図4】(a) ヘッドレストレイトが正しく調整されず、適正な高さよりも低い位置にある場合、後方から、例えば追突などの衝撃を受ける直前の状態を示す図である。

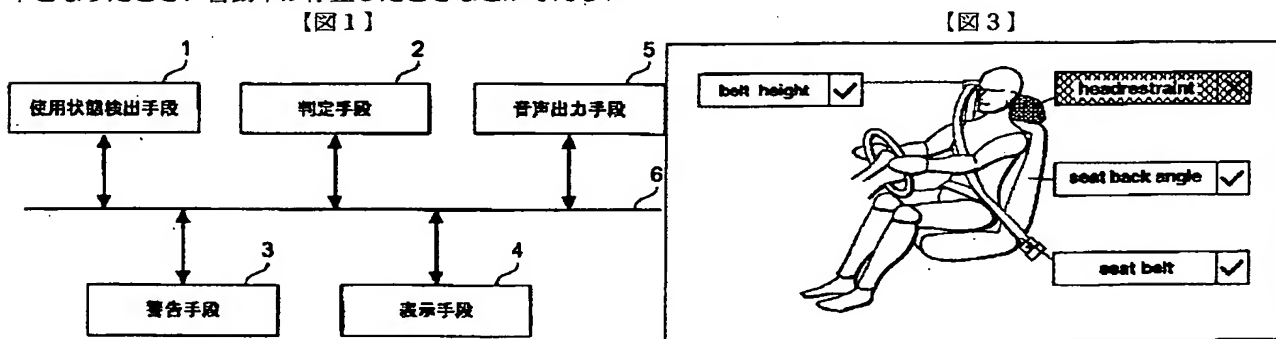
(b) 衝撃を受けた直後の状態を示す図である。

【図5】(a) 着目する安全装置を赤色で注目させる画面を示す図である。

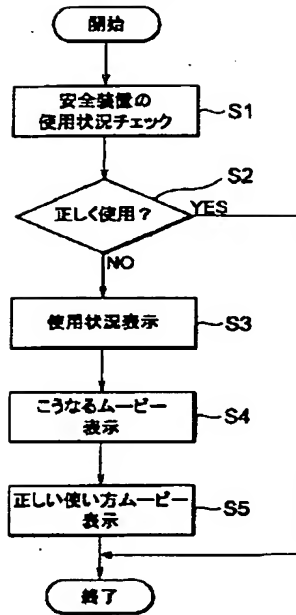
(b) 適正な高さに調整した状態を示す画面である。

【符号の説明】

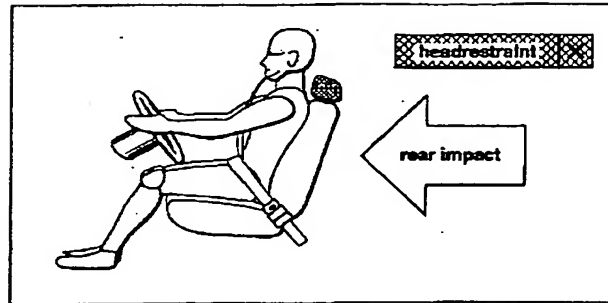
1…使用状態検出手段、2…判定手段、3…警告手段、4…表示手段、5…音声出力手段、6…制御バス。



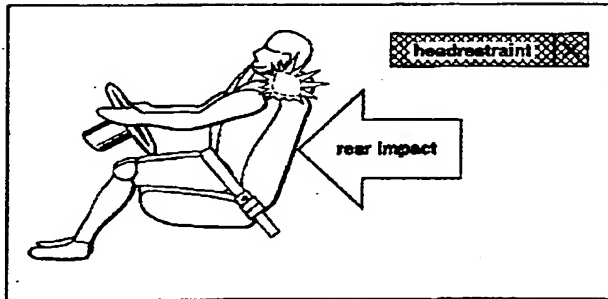
【図2】



【図4】

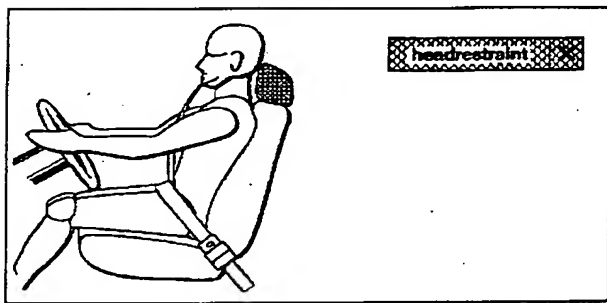


(a)

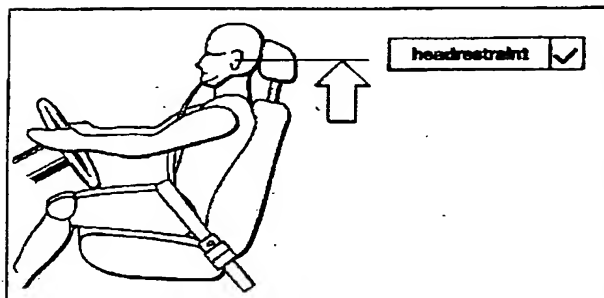


(b)

【図5】



(a)



(b)

【書誌的事項の続き】

【IPC7】	G08B 21/00;B60K 28/16;B60R 21/00	626::21/32;22/48;G10L 13/00:// B60R 11/02
【FI】	G08B 21/00;B60K 28/16;B60R 21/00	626;626:626:21/32;22/48;11/02;G10L 3/00
【Fターム】	3D020BA01;BB01;BC03;BD03;BD05;BE03	

3D037FA03;FA23;FA24;FA25;FA26;FA27;FA29
3D054EE09;EE10;EE13;EE34
5C086AA18;AA60;BA22;DA40;FA02;FA06;FA18
5D045AB17

【識別番号または出願人コード】 000003207

【出願／権利者名】 トヨタ自動車株式会社
愛知県豊田市トヨタ町1番地

【発明／考案者名】 中川 茂
愛知県豊田市トヨタ町1番地 トヨタ自動車株式会社内

【代理人】 長谷川 芳樹 (100088155)

【出願形態】 0L

注) 本抄録の書誌的事項は初期登録時のデータで作成されています。